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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/645,047	08/21/2003	Sampath Purushothaman	YOR920030029US2 (16841)	6546

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EXAMINER	
GRAYBILL, DAVID E	

ART UNIT	PAPER NUMBER
2822	

DATE MAILED: 04/24/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/645,047	PURUSHOTHAMAN ET AL.	
	Examiner	Art Unit	
	David E. Graybill	2822	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *01 February 2006*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-6,8-11 and 13-32* is/are pending in the application.

4a) Of the above claim(s) *19-32* is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-6 and 8-11* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application (PTO-152)
6) ☐ Other: _____.

A request for continued examination under 37 CFR 1.114, including the fee set forth in 37 CFR 1.17(e), was filed in this application after final rejection. Since this application is eligible for continued examination under 37 CFR 1.114, and the fee set forth in 37 CFR 1.17(e) has been timely paid, the finality of the previous Office action has been withdrawn pursuant to 37 CFR 1.114. Applicant's submission filed on 8-18-5 has been entered.

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

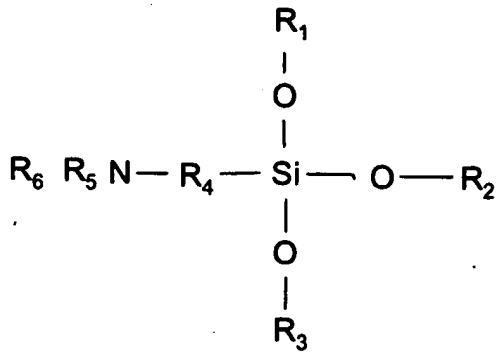
This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Claims 1-6, 8-11 and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art and Van Andel (5287003).

In the instant specification, at paragraphs 3-18, 29 and 51-53, applicant admits as prior art the following:

A structure for interconnecting semiconductor components comprising: a layered substrate 100 for transferring; said layered substrate is terminated with a terminal layer 103 that includes at least one metallic component; a bi-layer capping coating 200 on top of the layered substrate, each layer of said coating provides adhesion and protection; said bi-layer capping coating comprising a first layer of an amino silane entirely on said terminal layer including said at least one metallic component and a second layer of an amino silane atop said first layer of amino silane; and a carrier assembly 300, 400, 500; wherein said substrate to be transferred contains at least one semiconductor component; wherein said at least one semiconducting component is selected from the group consisting of semiconductor devices, semiconductor circuits, thin-film layers, passive and/or active elements, interconnecting elements, memory elements, micro-electro-mechanical elements, optical elements, optoelectronic elements, and photonic elements; wherein said carrier assembly comprises a carrier wafer 500, an adhesive layer 400 and an intermediate layer 300; wherein said carrier assembly

comprises glass and an intermediate layer of polyimide; wherein said carrier wafer is selected from the group consisting of silicon, silicon-on-insulator, silicon germanium-on-insulator, alumina, quartz, Group III-V or II-VI semiconductor wafers, and ceramics; wherein said metallic component is a patterned wiring level or a blanket film; wherein said metallic component is selected from the group consisting Ti, Ta, Zr, Hf, their silicides nitrides and their conducting siliconitrides; Cu, Al, composites of these materials with glass; and combinations thereof; wherein said capping coating provides passivation to the metallic component; wherein said capping coating comprises: a first layer that serves as a diffusion barrier, while providing adhesion to the substrate; and a second layer that is capable of providing adhesion to the carrier assembly and is an additional diffusion limiting layer; wherein said second layer comprises an amino silane and is an adhesion promoter to an intermediate layer 300; wherein said amino silane is a compound of the formula:



wherein R1, Ra, R3, R5 and m are, independently of each other, hydrogen, a lower alkyl radical containing from 1 to about 6 carbon atoms, an acyl radical containing 1 to 6 carbon atoms, or an allyl, alkylene or alkynyl radical containing 2 to 6 carbon atoms, and m is a lower alkyl containing from 1 to 6 carbon atoms or an aromatic system; wherein said polyimide material is selected from the group consisting of polyamic acid (PAA)-based polyimides, polyimic ester-based polyimides, and pre-imidized polyimides; wherein said carrier substrate comprises glass and intermediate layer of polyimide to allow for a further release process; wherein said first layer inherently further serves as protection (at least via adhesion and as a physical barrier) against a removal process of said carrier assembly.

To further clarify, applicant admits as prior art a bi-layer capping coating comprising a first layer of an amino silane entirely on said terminal layer including said at least one metallic component and a second layer of an amino silane atop said first layer of amino silane because applicant admits as prior art an amino silane capping coating having "a few monolayers." Furthermore, as cited, applicant discloses as prior art "a capping layer," and it is well settled that the term "a" or "an" ordinarily means "one or more." Tate Access Floors, Inc., and Tate Access Floors Leasing, Inc., v. Interface Architectural Resources, Inc., 279 F.3d 1357; 2002 U.S. App. LEXIS 1924; 61 U.S.P.Q.2D (BNA) 1647 ((citing Tate Access Floors, Inc. v. Maxcess

Techs., Inc, 222 F.3d 958, 966 n.4, 55 U.S.P.Q.2D (BNA) 1513, 1518 [**32] (citing Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 977, 52 U.S.P.Q.2D (BNA) 1109, 1112 (Fed. Cir. 1999))). "This court has repeatedly emphasized that an indefinite article 'a' or 'an' in patent parlance carries the meaning of 'one or more' in open-ended claims containing the transitional phrase 'comprising.' Unless the claim is specific as to the number of elements, the article 'a' receives a singular interpretation only in rare circumstances when the patentee evinces a clear intent to so limit the article." (Citations omitted). Scanner Technologies v./COS Vision Systems, 365 F.3d 1299, 1304 (Fed. Cir. 2004).

Applicant does not appear to explicitly admit as prior art wherein said bi-layer capping coating comprising a first layer of silicon nitride entirely on said terminal layer, and said first layer protects from an oxygen-based plasma removal process.

Nonetheless, at column 3, line 51 to column 6, line 3, Van Andel discloses wherein a bi-layer capping coating layer 20 comprises silicon nitride on said terminal layer including said at least one metallic component 18 and a second layer of an amino silane atop said first layer of silicon nitride, and said first layer protects from an oxygen-based plasma removal process. Moreover, it would have been obvious to combine this disclosure of Van Andel with applicant's admitted prior art by substituting the bi-layer

capping coating 20 of Van Andel for the capping coating 103 of applicant's admitted prior art, because, as disclosed by Van Andel as cited, it would desirably passivate the semiconductor component of the admitted prior art.

To further clarify, because applicant's admitted prior art amino silane layer 200 is entirely over the terminal layer, the substitution of the bi-layer capping coating 20 of Van Andel for the prior art amino silane layer, would provide a first layer of silicon nitride entirely on said terminal layer.

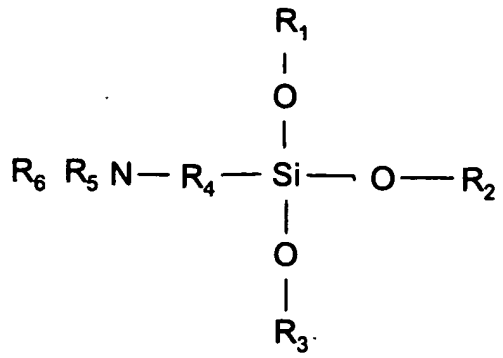
Claims 1-6, 8-11 and 13-18 are rejected under 35 U.S.C. 103(a) as being unpatentable over applicant's admitted prior art and Ponjée (0251347).

In the instant specification, at paragraphs 3-18, 29 and 51-53, applicant admits as prior art the following:

A structure for interconnecting semiconductor components comprising: a layered substrate 100 for transferring; said layered substrate is terminated with a terminal layer 103 that includes at least one metallic component; a bi-layer capping coating 200 on top of the layered substrate, each layer of said coating provides adhesion and protection; said bi-layer capping coating comprising a first layer of an amino silane entirely on said terminal layer including said at least one metallic component and a second layer of an amino silane atop said first layer of amino silane; and a carrier assembly 300, 400, 500; wherein said substrate to be transferred contains at least

one semiconductor component; wherein said at least one semiconducting component is selected from the group consisting of semiconductor devices, semiconductor circuits, thin-film layers, passive and/or active elements, interconnecting elements, memory elements, micro-electro-mechanical elements, optical elements, optoelectronic elements, and photonic elements; wherein said carrier assembly comprises a carrier wafer 500, an adhesive layer 400 and an intermediate layer 300; wherein said carrier assembly comprises glass and an intermediate layer of polyimide; wherein said carrier wafer is selected from the group consisting of silicon, silicon-on-insulator, silicon germanium-on-insulator, alumina, quartz, Group III-V or II-VI semiconductor wafers, and ceramics; wherein said metallic component is a patterned wiring level or a blanket film; wherein said metallic component is selected from the group consisting Ti, Ta, Zr, Hf, their silicides nitrides and their conducting siliconitrides; Cu, Al, composites of these materials with glass; and combinations thereof; wherein said capping coating provides passivation to the metallic component; wherein said capping coating comprises: a first layer that serves as a diffusion barrier, while providing adhesion to the substrate; and a second layer that is capable of providing adhesion to the carrier assembly and is an additional diffusion limiting layer; wherein said second layer comprises an amino silane and is an adhesion

promoter to an intermediate layer 300; wherein said amino silane is a compound of the formula:



wherein R1, Ra, R3, R5 and m are, independently of each other, hydrogen, a lower alkyl radical containing from 1 to about 6 carbon atoms, an acyl radical containing 1 to 6 carbon atoms, or an allyl, alkylene or alkynyl radical containing 2 to 6 carbon atoms, and m is a lower alkyl containing from 1 to 6 carbon atoms or an aromatic system; wherein said polyimide material is selected from the group consisting of polyamic acid (PAA)-based polyimides, polyimic ester-based polyimides, and pre-imidized polyimides; wherein said carrier substrate comprises glass and intermediate layer of polyimide to allow for a further release process; wherein said first layer inherently further serves as protection (at least via adhesion and as a physical barrier) against a removal process of said carrier assembly.

To further clarify, applicant admits as prior art a bi-layer capping coating comprising a first layer of an amino silane entirely on said terminal

layer including said at least one metallic component and a second layer of an amino silane atop said first layer of amino silane because applicant admits as prior art an amino silane capping coating having "a few monolayers." Furthermore, as cited, applicant discloses as prior art "a capping layer," and it is well settled that the term "a" or "an" ordinarily means "one or more." Tate Access Floors, Inc., and Tate Access Floors Leasing, Inc., v. Interface Architectural Resources, Inc., 279 F.3d 1357; 2002 U.S. App. LEXIS 1924; 61 U.S.P.Q.2D (BNA) 1647 ((citing Tate Access Floors, Inc. v. Maxcess Techs., Inc, 222 F.3d 958, 966 n.4, 55 U.S.P.Q.2D (BNA) 1513, 1518 [**32] (citing Elkay Mfg. Co. v. Ebco Mfg. Co., 192 F.3d 973, 977, 52 U.S.P.Q.2D (BNA) 1109, 1112 (Fed. Cir. 1999))). "This court has repeatedly emphasized that an indefinite article 'a' or 'an' in patent parlance carries the meaning of 'one or more' in open-ended claims containing the transitional phrase 'comprising.' Unless the claim is specific as to the number of elements, the article 'a' receives a singular interpretation only in rare circumstances when the patentee evinces a clear intent to so limit the article." (Citations omitted). Scanner Technologies v./COS Vision Systems, 365 F.3d 1299, 1304 (Fed. Cir. 2004).

Applicant does not appear to explicitly admit as prior art wherein said bi-layer capping coating comprising a first layer of silicon nitride entirely on

said terminal layer, and said first layer protects from an oxygen-based plasma removal process.

Nonetheless, at column 1, lines 1-29; and column 3, line 36 to column 5, line 50, Ponjée discloses wherein a bi-layer capping coating layer comprises silicon nitride 3 on a terminal layer including at least one metallic component 2 and a second layer of an amino silane 6 atop said first layer of silicon nitride, and said first layer inherently protects from an oxygen-based plasma removal process. Moreover, it would have been obvious to combine this disclosure of Ponjée with applicant's admitted prior art by substituting the bi-layer capping coating 3, 6 of Ponjée for the capping coating 103 of applicant's admitted prior art, because, as disclosed by Ponjée as cited, it would desirably passivate the semiconductor component of the admitted prior art. To further clarify, because applicant's admitted prior art amino silane layer 200 is entirely over the terminal layer, the substitution of the bi-layer capping coating 3, 6 for the prior art amino silane layer, would provide a first layer of silicon nitride entirely on said terminal layer.

Applicant's amendment and remarks filed 8-18-5 have been fully considered, are addressed by the rejections supra, and are further addressed infra.

Applicant argues, "Applicant observe that stating that capping layer 200 of the prior art may be a few monolayers thick only describes the

thickness of the amino silane capping layer of AAPA and does not indicate that the same is comprised of more than one material layer, as presently claimed.

This argument is respectfully traversed because a monolayer is a single continuous layer or film that is one molecule in thickness. Therefore, a few monolayers are a few single continuous layers or films that are one molecule in thickness.

The art made of record and not applied to the rejection is considered pertinent to applicant's disclosure. It is cited primarily to show inventions relevant to the examination of the instant invention.

For information on the status of this application applicant should check PAIR: Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

Alternatively, applicant may contact the File Information Unit at (703) 308-2733. Telephone status inquiries should not be directed to the examiner. See MPEP 1730VIC, MPEP 203.08 and MPEP 102.

Any other telephone inquiry concerning this communication or earlier communications from the examiner should be directed to David E. Graybill at (571) 272-1930. Regular office hours: Monday through Friday, 8:30 a.m. to 6:00 p.m.
The fax phone number for group 2800 is (571) 273-8300.

David E. Graybill

Primary Examiner
Art Unit 2822

D.G.
10-Apr-06